

WHAT IS CLAIMED IS:

1. A solid support comprising (i) a solid noncompressible material, and (ii) a tether polymer covalently bound to the solid that is amenable to grafting with other polymers, and (iii) a protective polymeric surface covering that reduces nonspecific interactions of solutes with said solid, and (iv) a functional polymer or copolymer grafted to the tether polymer and possessing useful chemical functionality.
2. The solid support of claim 1 having sorptive capacity.
3. The solid support of claim 2 having reversible sorptive capacity.
4. The solid support of claim 1 further comprising chemical stability on exposure to strong acidic or alkaline medium.
5. The solid support of claim 1 that is substantively devoid of nonspecific binding of proteins and other biomacromolecules to the surface of said solid.
6. The solid support of claim 1 in which said solid is silica.
7. The solid support of claim 1 in which said solid is alumina.
8. The solid support of claim 1 in which said solid is polystyrene.
9. The solid support of claim 2 in which the solid is porous silica, alumina, or polystyrene.
10. The solid support of claim 2 in which the solid is a silica membrane.
11. The solid support of claim 7 in which the solid is an alumina membrane.
12. The solid support of claim 1 in which the solid is a polymer membrane.

13. The solid support of claim 1 in which said grafted functional polymer or copolymer is prepared by polymerization of vinyl monomers.
14. The solid support of claim 13 in which said grafted functional polymer or copolymer is prepared by polymerization of vinyl monomers in the presence of a
5 polymerization initiator.
15. The solid support of claim 13 in which said grafted functional polymer or copolymer is prepared by polymerization of vinyl monomers in the presence of a polymerization initiator selected from the group consisting of persulfate/tertiary amine, persulfate and a transition metal, nitriles, azo compounds, and photochemical initiators.
- 10 16. The solid support of claim 13 in which said grafted functional polymer or copolymer is prepared by polymerization of vinyl monomers initiated by radiant energy.
17. The solid support of claim 1 in which said grafted functional polymer or copolymer is prepared by polymerization of monomers under atom transfer radical polymerization conditions.
- 15 18. The solid support of claim 1 in which said grafted functional polymer or copolymer is prepared by polymerization of monomers under cation initiated polymerization conditions.
19. The solid support of claim 1 in which said grafted functional polymer or copolymer is prepared by polymerization of monomers under anion initiated
20 polymerization conditions.
20. The solid support of claim 1 in which the protective polymeric surface is prepared by reaction of said solid with trihalo or trialkoxy silane reagents.
21. The solid support of claim 1 in which the tether polymer is bound to the material by reaction of said material with trihalo or trialkoxy silane reagents.

22. The solid support of claim 1 in which the tether polymer is bound to said material by reaction of said material with trihalo or trialkoxy silane reagents, said silane reagents having functional groups selected from the group consisting of polybutadiene, polyethylene glycol, polyvinyl alcohol, polypropylene glycol.
- 5 23. The solid support of claim 8 in which the tether polymer is bound to said material by reaction of said material with an electrophilic reagent, said electrophilic reagents having functional groups selected from the group consisting of polyethylene glycol, polyvinyl alcohol, polypropylene glycol.
- 10 24. The solid support of claim 1 in which the protective polymeric surface covering is prepared by reaction of said material with trihalo or trialkoxy silane reagents, said silane reagents having functional groups selected from the group consisting of 2-trichlorosilylethyl, methoxy propyl ethylene glycol, substituted ethylene glycols, and alkyl.
- 15 25. The solid support of claim 1 in which said grafted functional polymer or copolymer has cation exchange functionality.
26. The solid support of claim 1 in which said grafted functional polymer or copolymer has anion exchange functionality.
27. The solid support of claim 1 in which said grafted functional polymer or copolymer has metal binding functionality.
- 20 28. The solid support of claim 1 in which said grafted functional polymer or copolymer has metal chelating functionality.
29. The solid support of claim 1 in which said grafted functional polymer or copolymer has catalytic functionality.

30. The solid support of claim 1 in which said grafted functional polymer or copolymer has a hydrophobic functionality.
31. The solid support of claim 1 in which said grafted functional polymer or copolymer has selective functional groups attached to the polymer or copolymer chain
5 that selectively adsorbs molecules or ions from solutions in contact with the solid support.
32. The solid support of claim 1 in which said grafted functional polymer or copolymer has functional groups useful for initiating solid supported syntheses.